VIBRATIONAL MODEL OF THERMAL CONDUCTIVITY IN STRONGLY COUPLED COMPLEX PLASMA FLUIDS

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A simple vibrational model of heat transfer in fluids with soft pairwise interatomic interactions is discussed [1]. A general expression is derived and applied to quantify heat transfer in strongly coupled plasma-related systems, such as a three-dimensional one-component plasma and single component Yukawa fluid (a simplest model of complex plasma). Good agreement with existing numerical results is documented. The applicability of the model is not limited to plasma-related systems, it applies for instance to dense Lennard-Jones liquids. Remarkable agreement with the available numerical results is documented in this case. The model can be easily generalized to heat conduction in two-dimensional systems. Although the problem of transport processes in two-dimensional systems remains a controversial issues, some comments related to heat conduction in two-dimensional complex (dusty) plasma layers can be made [2].

REFERENCES:

[1] Khrapak S. Vibrational model of thermal conduction in fluids with soft interactions // Phys. Rev. E. 2021. V. 103. P. 013207.

[2] Khrapak S. Thermal conduction in two-dimensional complex plasma layers // Phys. Plasmas. 2021. V. 28. P. 010704.